National Institute of Environmental Health Sciences

Relationships between esophageal cancer and spatial environment factors by using Geographic Information System

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Year: 2008
Journal: The Science of The Total Environment. 393 (3-Feb): 219-225

Abstract:

To explore the relationships between esophageal cancer (EC) and climatic, geographic factors in China by using Geographic Information System, database of EC mortality of 237 sampling areas surveyed in 1990-1992 was established in Excel and linked with the digital polygon maps of study areas. Geographic and climate data of sampling areas were extracted from the raster dataset and finished in Arc/Info 9.0 and ENVI4.2 software by using spatial analysis. Spearman correlation analysis and multiple regression analysis after principal component analysis (PCA) were performed to analyze the relationship between EC and these factors. The counties that have the highest EC morality show significant aggregation. Spearman correlation analysis shows weak negative correlation between precipitation, water-heat index (WHI), highest/lowest temperature and EC mortality, and weak positive correlation between drought index (DI), wind speed, population density and EC mortality. Multiple linear regression analysis indicated that the variables associated with EC mortality were precipitation, temperature, wind speed, elevation, DI, WHI and normalized difference vegetation index (NDVI) of July. Our study suggested that the high-risk areas of EC in China are mostly drought and low altitude areas relatively. There were relatively lower NDVI in summer and higher wind speed in these areas. GIS can be applied to cancer epidemiology study and will exert active effect, which should be further explored.

Source: http://dx.doi.org/10.1016/j.scitotenv.2007.12.029

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Security, Meteorological Factors, Precipitation, Temperature, Other Exposure

Extreme Weather Event: Drought

Other Exposure: water-heat index

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cancer, Other Health Impact

Other Health Impact: esophageal cancer mortality

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified